ABSTRACT

A method and apparatus are disclosed for joint equalization and decoding of multilevel codes, such as the MLT-3 code, which are transmitted over dispersive channels. The MLT-3 code is treated as a code generated by a finite-state machine using a trellis having state dependencies between the various states. A super trellis concatenates the MLT-3 trellis with a trellis representation of the channel. Joint equalization and decoding of the received signal can be performed using the super trellis. A sequence detector is disclosed that uses the super trellis or a corresponding reduced-state trellis to perform joint equalization and decoding of the received signal to decode the MLT-3 coded data bits. The sequence detector may be embodied using maximum likelihood sequence estimation that applies the optimum Viterbi algorithm or a reduced complexity sequence estimation method, such as the reduced-state sequence estimation (RSSE) algorithm.

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